

What is claimed is:

- 1 1. A method for generating a set of random numbers with statistics
2 represented by a cumulative density function, comprising:
3 generating a set of uniformly spaced samples between an upper limit
4 and a lower limit;
5 mapping each one of said set of uniformly spaced samples to a
6 corresponding value on a cumulative density function curve; and
7 scrambling said set of uniformly spaced samples.
- 1 2. The method of claim 1, wherein said set of uniformly spaced
2 samples are ordered in descending fashion.
- 1 3. The method of claim 2, wherein said set of uniformly spaced
2 samples have an upper limit of 1 and a lower limit of 0.
- 1 4. The method of claim 2, wherein said set of uniformly spaced
2 samples have an upper limit of 100% and a lower limit of 0%.
- 1 5. The method of claim 2, wherein said step of mapping said
2 corresponding value for each of said set of uniformly spaced samples includes looking
3 up said corresponding value, which is stored in ascending order in a look-up table.
- 1 6. The method of claim 5, wherein said step of looking up
2 proceeds without the need for any pre-sorting.

7. The method of claim 1, further comprising:

1 companding said uniformly spaced samples in order to increase the
2 representation of low-probability samples.

1 8. The method of claim 7, wherein a percentage of events
2 occurring in said low-probability area is determined as compared to a high-probability
3 area.

1 9. The method of claim 8, wherein based on the relative
2 percentages between said low-probability area and said high probability area, said
3 samples in said low-probability area are increased by a companding factor, while said
4 samples in said high-probability area are decreased by said companding factor.

1 10. The method of claim 9, wherein a probability of said high-
2 probability area is divided by said companding factor.

1 11. A method of random number generation with a desired
2 cumulative density function, comprising:

3 generating a set of discrete samples between an upper limit and a lower
4 limit;

5 uniformly stepping said set of discrete samples in descending order
6 between said upper limit and said lower limit; and

7 mapping said set of random numbers to a set of values stored in
8 ascending order and having a specified probability density function.

1 12. The method of claim 11, further comprising:

2 scrambling said set of discrete samples between said upper limit and
3 said lower limit.

1 13. The method of claim 11, wherein said upper limit is 1 and said
2 lower limit is 0.

1 14. The method of claim 11, wherein said upper limit is 100% and
2 said lower limit is 0%.

1 15. The method of claim 11, further comprising:
2 companding said set of discrete samples to provide a more accurate
3 representation of low-probability samples.

1 16. The method of claim 15, wherein said step of companding
2 includes, compressing the number of low-probability samples using larger stepping
3 intervals while expanding the number of high-probability samples using smaller
4 stepping intervals.

1 17. A random number generation system, comprising:
2 a first component for generating uniformly-spaced numbers,
3 independent of a total number of samples;
4 a second component for mapping said generated random numbers into
5 a desired distribution through table lookup and scrambling; and
6 a third component for reducing said total number of samples needed to
7 achieve a given statistical accuracy.

1 18. The system of claim 17, wherein said generated random
2 numbers are uniformly spaced between an upper limit of 1 or 100% and a lower limit
3 of 0 or 0%.

1 19. The system of claim 17, wherein said third component
2 compresses the number of low probability samples while expanding the number of
3 high-probability samples.

1 20. The system of claim 17, wherein said generated random
2 numbers are ordered in descending fashion.